NAD

SERVICE MANUAL

C 320BEE

STEREO AMPLIFIER

C 320BEE

STEREO AMPLIFIER

PRODUCT SAFETY SERVICING GUIDELINES

CAUTION : DO NOT ATTEMPT TO MODIFY THIS PRODUCT IN ANY WAY. NEVER PERFORM CUSTOMIZED INSTALLATIONS WITHOUT MANUFACTURER'S APPROVAL. UNAUTHORIZED MODIFICATIONS WILL NOT ONLY VOID THE WARRANTY, BUT MAY LEAD TO YOUR BEING LIABLE FOR ANY RESULTING PROPERTY DAMAGE OR USER INJURY.

SERVICE WORK SHOULD BE PERFORMED ONLY AFTER YOU ARE THOROUGHLY FAMILIAR WITH ALL OF THE FOLLOWING SAFETY CHECKS AND SERVICING GUIDELINES. TO DO OTHERWISE, INCREASES THE RISK OF POTENTIAL HAZARDS AND INJURY TO THE USER.

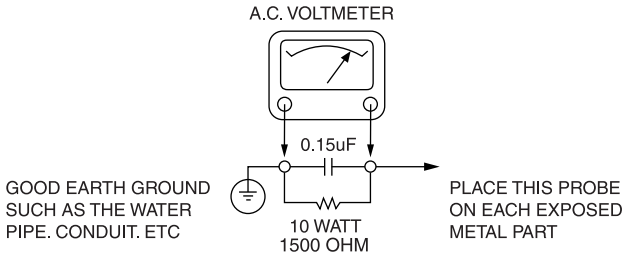
WHILE SERVICING, USE AN ISOLATION TRANSFORMER FOR PROTECTION FROM AC LINE SHOCK.

SAFETY CHECKS

AFTER THE ORIGINAL SERVICE PROBLEM HAS BEEN CORRECTED. A CHECK SHOULD BE MADE OF THE FOLLOWING.

SUBJECT : FIRE & SHOCK HAZARD

1. BE SURE THAT ALL COMPONENTS ARE POSITIONED IN SUCH A WAY AS TO AVOID POSSIBILITY OF ADJACENT COMPONENT SHORTS. THIS IS ESPECIALLY IMPORTANT ON THOSE MODULES WHICH ARE TRANSPORTED TO AND FROM THE REPAIR SHOP.
2. NEVER RELEASE A REPAIR UNLESS ALL PROTECTIVE DEVICES SUCH AS INSULATORS, BARRIERS, COVERS, SHIELDS, STRAIN RELIEFS, POWER SUPPLY CORDS, AND OTHER HARDWARE HAVE BEEN REINSTALLED PER ORIGINAL DESIGN. BE SURE THAT THE SAFETY PURPOSE OF THE POLARIZED LINE PLUG HAS NOT BEEN DEFEATED.
3. SOLDERING MUST BE INSPECTED TO DISCOVER POSSIBLE COLD SOLDER JOINTS, SOLDER SPLASHES OR SHARP SOLDER POINTS. BE CERTAIN TO REMOVE ALL LOOSE FOREIGN PARTICLES.
4. CHECK FOR PHYSICAL EVIDENCE OF DAMAGE OR DETERIORATION TO PARTS AND COMPONENTS. FOR FRAYED LEADS, DAMAGED INSULATION (INCLUDING AC CORD). AND REPLACE IF NECESSARY FOLLOW ORIGINAL LAYOUT, LEAD LENGTH AND DRESS.
5. NO LEAD OR COMPONENT SHOULD TOUCH A RECEIVING TUBE OR A RESISTOR RATED AT 1 WATT OR MORE. LEAD TENSION AROUND PROTRUDING METAL SURFACES MUST BE AVOIDED.
6. ALL CRITICAL COMPONENTS SUCH AS FUSES, FLAMEPROOF RESISTORS, CAPACITORS, ETC. MUST BE REPLACED WITH EXACT FACTORY TYPES, DO NOT USE REPLACEMENT COMPONENTS OTHER THAN THOSE SPECIFIED OR MAKE UNRECOMMENDED CIRCUIT MODIFICATIONS.
7. AFTER RE-ASSEMBLY OF THE SET ALWAYS PERFORM AN AC LEAKAGE TEST ON ALL EXPOSED METALLIC PARTS OF THE CABINET, (THE CHANNEL SELECTOR KNOB, ANTENNA TERMINALS. HANDLE AND SCREWS) TO BE SURE THE SET IS SAFET TO OPERATE WITHOUT DANGER OF ELECTRICAL SHOCK. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST USE AN AC VOLTMETER, HAVING 5000 OHMS PER VOLT OR MORE SENSITIVITY, IN THE FOLLOWING MANNER; CONNECT A 1500 OHM 10 WATT RESISTOR, PARALLELED BY A .15 MFD, 150V AC TYPE CAPACITOR BETWEEN A KNOWN GOOD EARTH GROUND (WATER PIPE, CONDUIT, ETC.) AND THE EXPOSED METALLIC PARTS, ONE AT A TIME.
   MEASURE THE AC VOLTAGE ACROSS THE COMBINATION OF 1500 OHM RESISTOR AND .15 MFD CAPACITOR.
   REVERSE THE AC PLUG AND REPEAT AC VOLTAGE MEASUREMENTS FOR EACH EXPOSED METALLIC PART.
   VOLTAGE MEASURE MUST NOT EXCEED 75 VOLTS R.M.S. THIS CORRESPONDS TO 0.5 MILLIAMP AC ANY VALUE EXCEEDING THIS LIMIT CONSTITUTES A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED IMMEDIATELY.


A.C. VOLTMETER
0.15uF
GOOD EARTH GROUND SUCH AS THE WATER PIPE. CONDUIT. ETC
10 WATT 1500 OHM
PLACE THIS PROBE ON EACH EXPOSED METAL PART

SUBJECT : GRAPHIC SYMBOLS

THE LIGHTNING FLASH WITH ARROWHEAD SYMBOL, WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE USER TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" WITHIN THE PRODUCT'S ENCLOSURE THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.

THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE USER TO THE PRESENCE OF IMPORTANT OPERATING AND MAINTENANCE (SERVICING) INSTRUCTIONS IN THE LITERATURE ACCOMPANYING THE APPLIANCE.

SUBJECT : TIPS ON PROPER INSTALLATION

1. NEVER INSTALL ANY PRODUCT IN A CLOSED-IN RECESS, CUBBYHOLE OR CLOSELY FITTING SHELF SPACE. OVER OR CLOSE TO HEAT DUCT, OR IN THE PATH OF HEATED AIR FLOW.
2. AVOID CONDITIONS OF HIGH HUMIDITY SUCH AS: OUTDOOR PATIO INSTALLATIONS WHERE DEW IS A FACTOR, NEAR STEAM RADIATORS WHERE STEAM LEAKAGE IS A FACTOR, ETC.
3. AVOID PLACEMENT WHERE DRAPERIES MAY OBSTRUCT REAR VENTING. THE CUSTOMER SHOULD ALSO AVOID THE USE OF DECORATIVE SCARVES OR OTHER COVERINGS WHICH MIGHT OBSTRUCT VENTILATION.
4. WALL AND SHELF MOUNTED INSTALLATIONS USING A COMMERCAL MOUNTING KIT MUST FOLLOW THE FACTORY APPROVED MOUNTING INSTRUCTIONS A PRODUCT MOUNTED TO A SHELF OR PLATFORM MUST RETAIN ITS ORIGINAL FEET (OR THE EQUIVALENT THICKNESS IN SPACERS) TO PROVIDE ADEQUATE AIR FLOW ACROSS THE BOTTOM, BOLTS OR SCREWS USED FOR FASTENERS MUST NOT TOUCH ANY PARTS OR WIRING. PERFORM LEAKAGE TEST ON CUSTOMIZED INSTALLATIONS.
5. CAUTION CUSTOMERS AGAINST THE MOUNTING OF A PRODUCT ON SLOPING SHELF OR A TILTED POSITION, UNLESS THE PRODUCT IS PROPERLY SECURED.
6. A PRODUCT ON A ROLL-ABOUT CART SHOULD BE STABLE ON ITS MOUNTING TO THE CART. CAUTION THE CUSTOMER ON THE HAZARDS OF TRYING TO ROLL A CART WITH SMALL CASTERS ACROSS THRESHOLDS OR DEEP PILE CARPETS.
7. CAUTION CUSTOMERS AGAINST THE USE OF A CART OR STAND WHICH HAS NOT BEEN LISTED BY UNDERWRITERS LABORATORIES, INC. FOR USE WITH THEIR SPECIFIC MODEL OF TELEVISION RECEIVER OR GENERICALLY APPROVED FOR USE WITH T.V.'S OF THE SAME OR LARGER SCREEN SIZE.
8. CAUTION CUSTOMERS AGAINST THE USE OF EXTENSION CORDS, EXPLAIN THAT A FOREST OF EXTENSIONS SPROUTING FROM A SINGLE OUTLET CAN LEAD TO DISASTROUS CONSEQUENCES TO HOME AND FAMILY.

SERVICING PRECAUTIONS

CAUTION : Before servicing the A/V Receiver covered by this service data and its supplements and addends, read and follow the *SAFETY PRECAUTIONS. NOTE* : if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publication, always follow the safety precautions.
Remember Safety First:

General Servicing Precautions

1. Always unplug the A/V Receiver AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
   (2) Disconnecting or reconnecting any internal electrical plug or other electrical connection.
   (3) Connecting a test substitute in parallel with an electrolytic capacitor.
   Caution : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Do not spray chemicals on or near this A/V Receiver or any of its assemblies.

3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cottontipped swab, or comparable soft applicator.
   Unless specified otherwise in this service data, lubrication of contacts is not required.

4. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.

5. Do not apply AC power to this A/V Receiver and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

6. Always connect test instrument ground lead to the appropriate ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter(500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M-ohm.
Note 1 : Accessible Conductive Parts including Metal panels, Input terminals, Earphone jacks, etc.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical Es devices are integrated circuits and some field effect transistors and semiconductor chip components.
The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.

4. Use only an antistatic solder removal device. Some solder removal devices not classified a “anti-static” can generate electrical charges sufficient to damage ES devices.

5. Do not use freonpropelled chemicals. These can generate electrical charge sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handing unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

SPECIFICATIONS

POWER AMPLIFIER SECTION
STEREO MODE

CONTINUOUS AVERAGE POWER OUTPUT INTO 8 OHMS OR 4 OHMS (Min. power per channel, 20 Hz – 20 kHz, with no more than rated distortion)	**50 W (17 dBW)**
Rated Distortion (THD 20 Hz – 20 kHz)	**0.03%**
Clipping power (maximum continuous power per channel 4 and 8).	**68 W**
IHF dynamic headroom: at 8 ohms	**+ 3.4 dB**
at 4 ohms	**+ 5.0 dB**
IHF dynamic power (maximum short term power per channel)	
8 ohms:	**110 W (20.4 dBW)**
4 ohms:	**160 W (22.0 dBW)**
2 ohms:	**210 W (23.2 dBW)**
Damping factor (ref. 8 ohms 1 kHz)	**> 180**
Input Impedance	**R = 20 kohms** **C = 470 pF**
Input sensitivity (for rated output into 8 ohms)	**630 mV**
Voltage gain	**29 dB**
Frequency response 20 Hz – 20 kHz	± **0.2 dB**
Signal / Noise ratio, A-weighted	**100 dB ref. 1 W** **117 dB ref. 50 W**
THD + Noise (Total Harmonic Distortion, 20 Hz – 20 kHz, from 250 mW to rated output)	**< 0.03%**
SMPTE I.M. (Intermodulation Distortion, 60 Hz + 7 kHz, 4:1, from 250 mW to rated output)	**< 0.01%**
IHF I.M. (CCIF IM Distortion, 19 + 20 kHz at rated output)	**< 0.01%**
Headphones Output Impedance	**220 ohms**

PREAMPLIFIER SECTION

LINE LEVEL INPUTS
(Disk, CD, Video, Auxiliary, Tuner, Tape 1,Tape 2)

Input impedance (R and C)	**200 kohms + 320 pF**
Input sensitivity (ref. rated power)	**220 mV**
Maximum input signal	**6 V**
Signal / Noise ratio, A-weighted (from CD Input to Speakers Output, Volume Setting for 500mV in , 8ohms 1W out)	**93.0 dB ref. 1W**
Signal to noise ratio preamp out, IHF “A” weighted	**106 dB re 500mV**
Frequency response, 20 Hz – 20 kHz	**< +/-0.1 dB (tone defeat on)** **< +/-0.5 dB (tone defeat off)**
THD + Noise, SMPTE IM	**< 0.01% at 5 V out**

LINE LEVEL OUTPUTS

Pre-amp output impedance			**80 ohms**
Tape output impedance			**Source Z + 1kohms**
Maximum output level	pre-amp out	:	**> 12 V**
	Tape-out	:	**> 10 V**

CONTROLS

Treble	**+/- 5 dB at 10 kHz**
Bass	**+/- 8 dB at 100 Hz**

IR IN and OUT

Input Resistance	**> 10 kohms**
Input Voltage	**Min 5 V**
Output Resistance	**< 30 ohms**

TRIGGER Out

Output Current	**50 mA**
Output Voltage	**12 V**

DIMENSIONS AND WEIGHTS

Net Weight	**6.5 kg (14.3 lb)**
Shipping Weight	**8 kg (17.6 lb)**
DIMENSION (W×H×D)	**435 ´ 100 ´ 290MM**

ALIGNMENT PROCEDURES

I. INITIAL ADJUSTMENT (No load connected)

A. OUTPUT OFFSET VOLTAGE

1. Connect a DC Millivoltmeter to L Channel speaker output terminals.

2. Turn unit ON and adjust VR21 (100 ohms) to get the reading of 0V+/-30mV.

3. Connect the DC Millivoltmeter to R Channel speaker output terminals and adjust VR11 (100ohms) to get a reading of 0V+/-30mV.

B. IDLING CURRENT

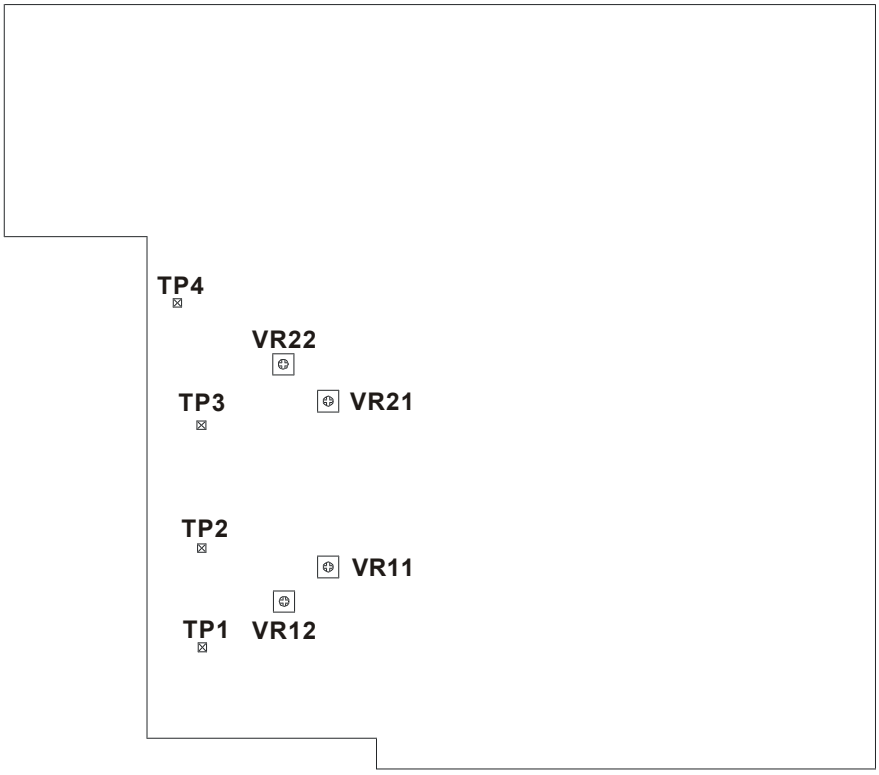
1. Connect a DC Millivoltmeter to TP1 and TP2 and adjust VR12 (300 ohms) for 3-5mV reading on meter.

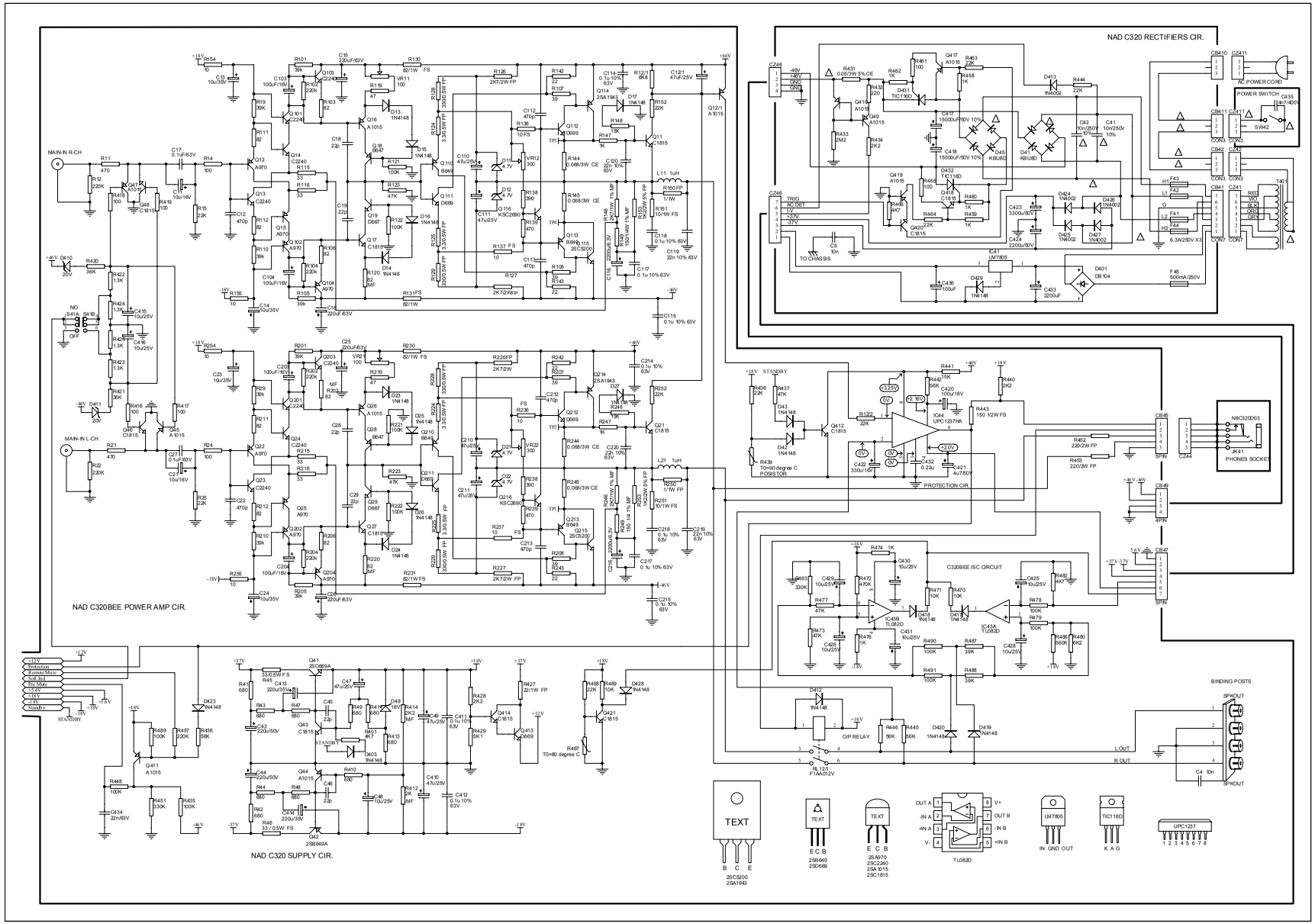
2. Connect the DC Millivoltmeter to TP3 and TP4 and adjust VR22 (300 ohms) for 3-5mV reading on meter.

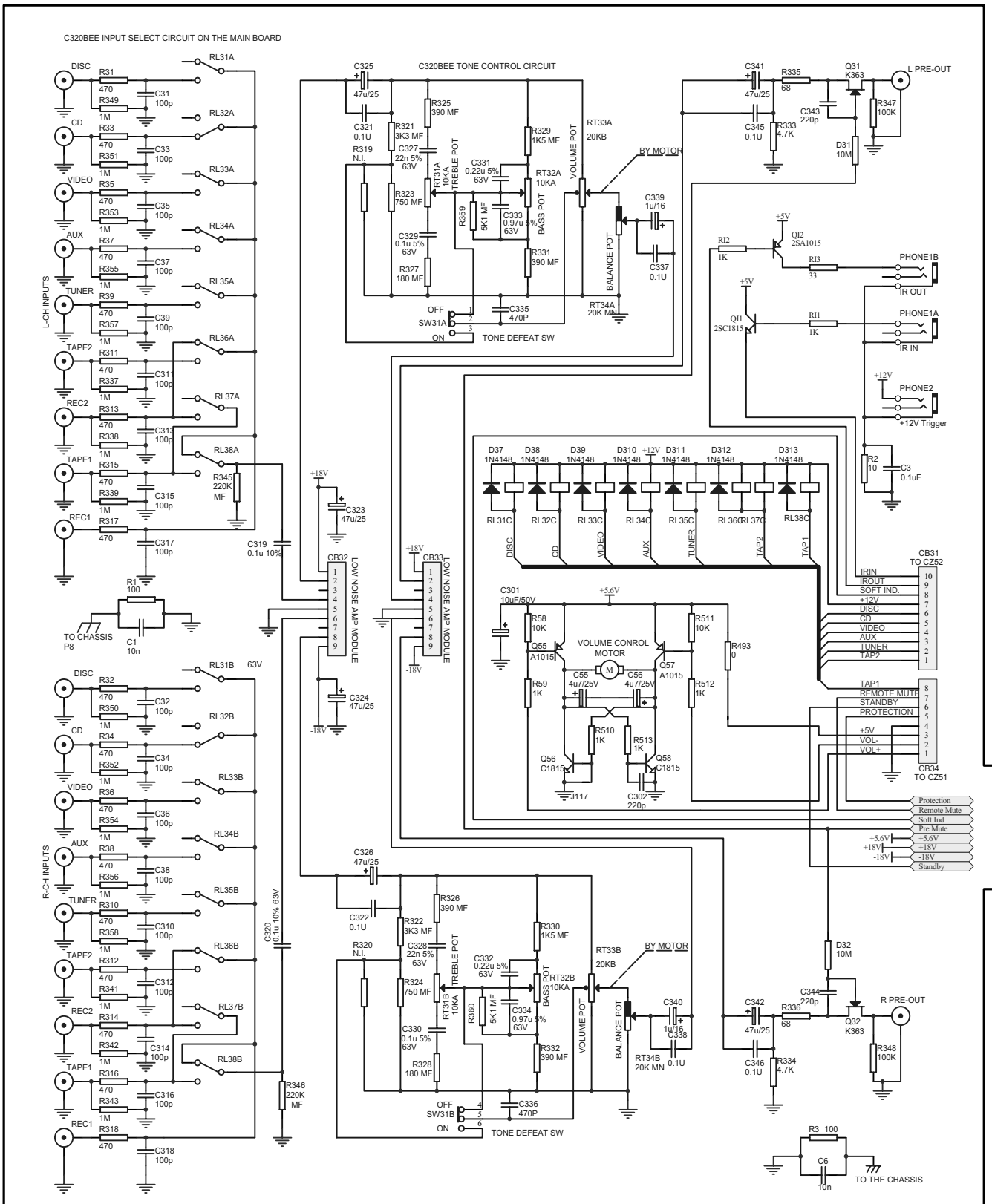
3. Leave power on for a minimum of 5 minutes.

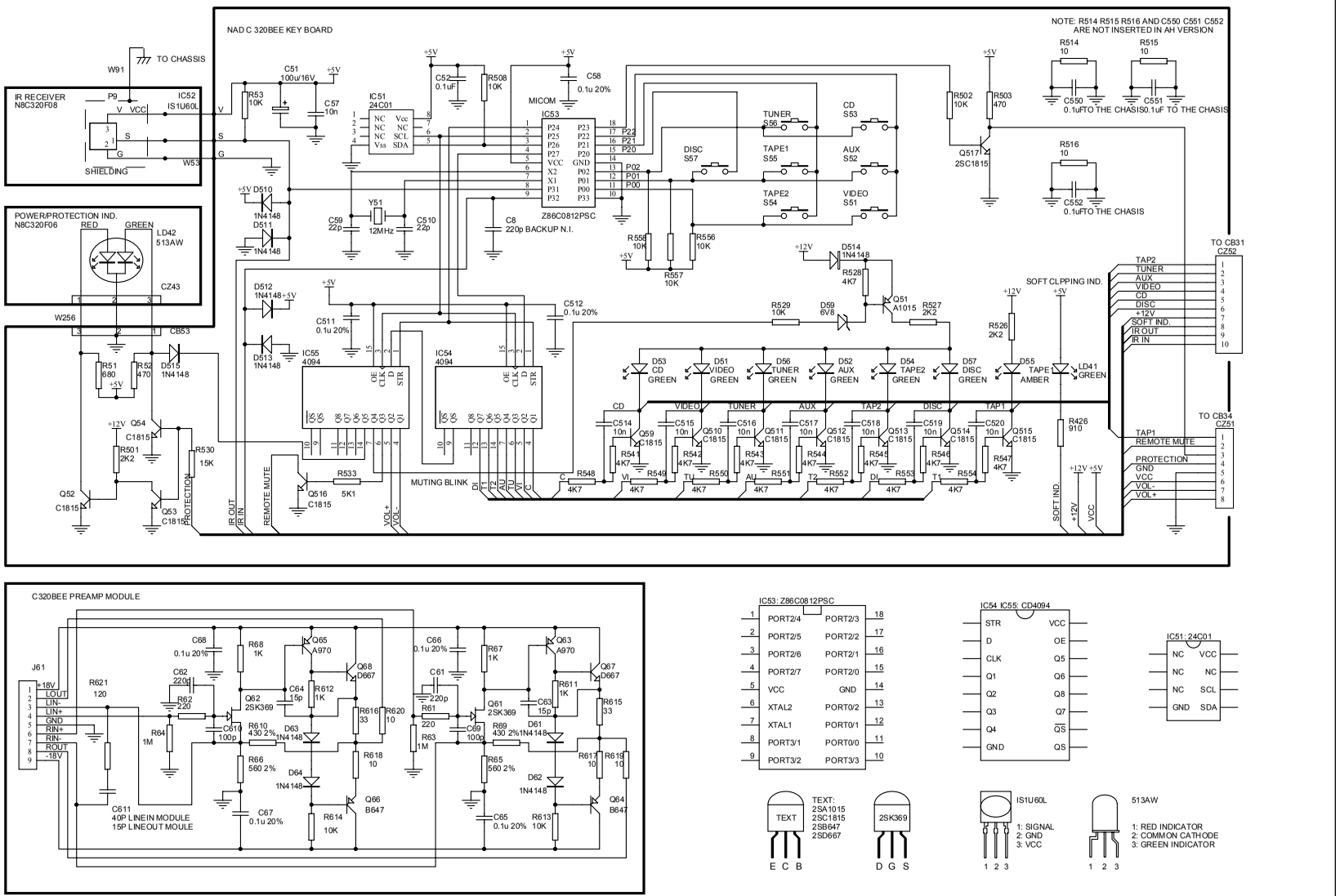
II. FINAL ADJUSTMENT

Repeat procedure A and B for offset voltage and idling current alignment respectively.

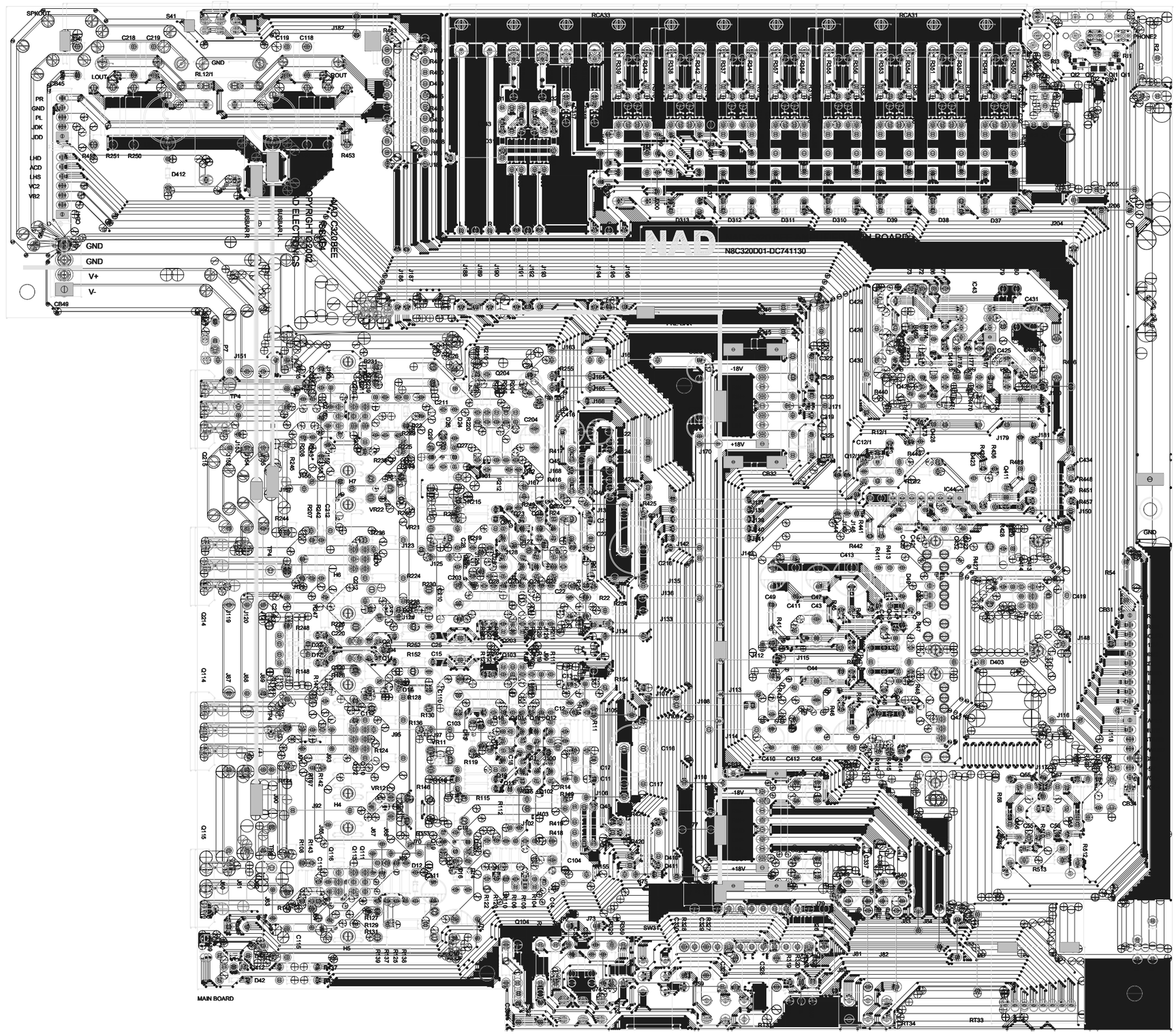



NAD C320 RECTIFIERS CIR.
NAD C320BEE POWER AMP CIR.
NAD C320 SUPPLY CIR.
PROTECTION CIR.
C320BEE ISC CIRCUIT
O/P RELAY
BINDING POSTS
PHONES SOCKET
POWER SWITCH
AC POWER CORD
MAIN-IN R-CH
MAIN-IN L-CH
STANDBY
TEXT
2SC5200
2SA1943
2SB649
2SD669
2SA970
2SC2240
2SA1015
2SC1815
TL082D
LM7805
TIC116D
UPC1237

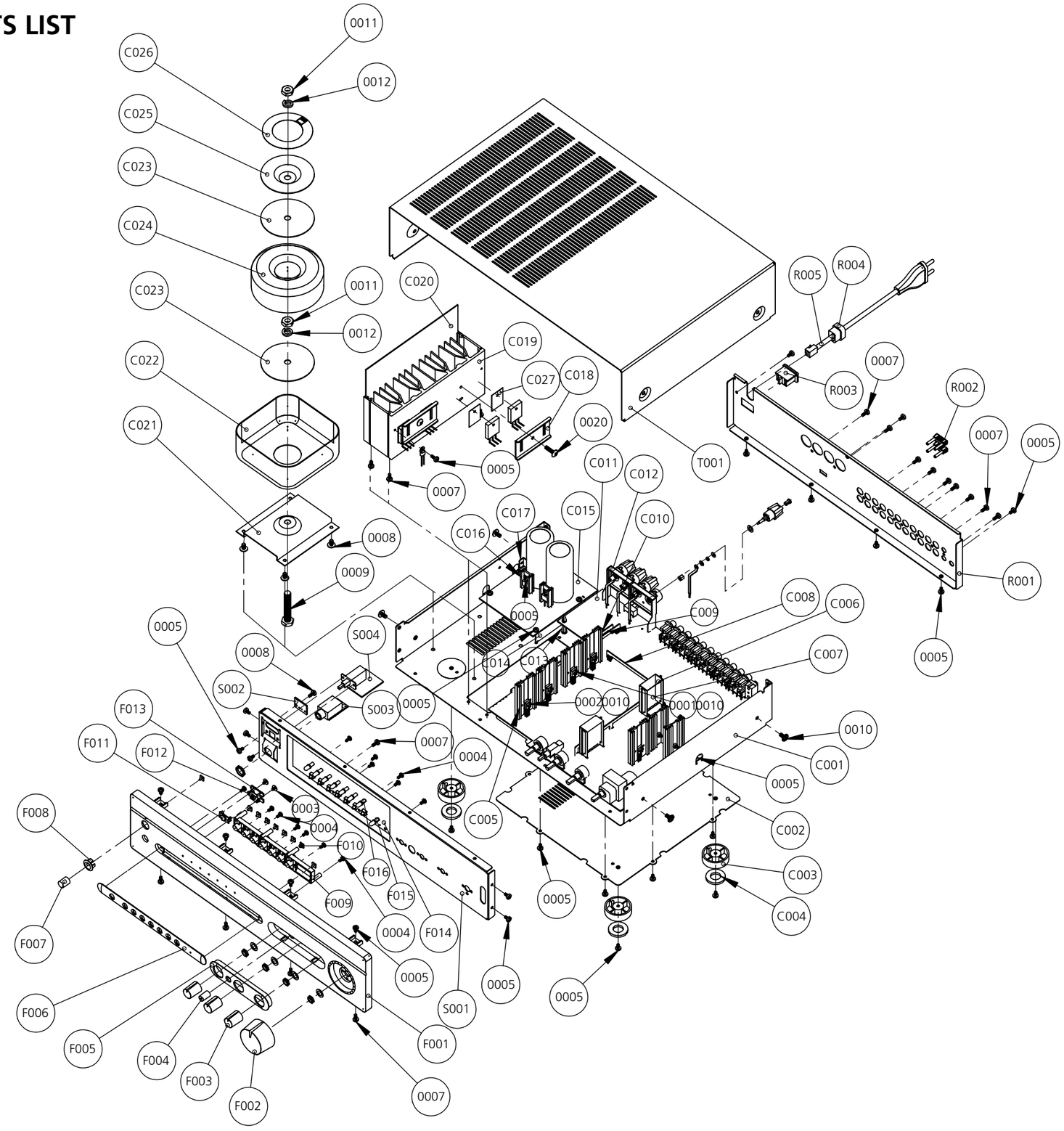

C320BEE INPUT SELECT CIRCUIT ON THE MAIN BOARD
L-CH INPUTS
R-CH INPUTS
DISC
CD
VIDEO
AUX
TUNER
TAPE2
REC2
TAPE1
REC1
RL31A
RL32A
RL33A
RL34A
RL35A
RL36A
RL37A
RL38A
TO CHASSIS P8
C320BEE TONE CONTROL CIRCUIT
VOLUME POT
BALANCE POT
TREBLE POT
BASS POT
BY MOTOR
OFF
ON
SW31A
TONE DEFEAT SW
L PRE-OUT
R PRE-OUT
LOW NOISE AMP MODULE
CB32
CB33
VOLUME CONROL MOTOR
CB31 TO CZ52
CB34 TO CZ51
IRIN
IROUT
SOFT IND.
+12V
DISC
CD
VIDEO
AUX
TUNER
TAP2
TAP1
REMOTE MUTE
STANDBY
PROTECTION
+5V
VOL-
VOL+
Protection
Remote Mute
Soft Ind
Pre Mute
+5.6V
+18V
-18V
Standby
PHONE1B
IR OUT
PHONE1A
IR IN
PHONE2
+12V Trigger
TO THE CHASSIS
2SK369
D G S
MAIN POT
ALPS RK16812MG
PRE-AMP MODULE
1: +18V
2: LOUT
3: LIN-
4: LIN+
5: GND
6: RIN+
7: RIN-
8: ROUT
9: -18V


NAD C 320BEE KEY BOARD
NOTE: R514 R515 R516 AND C550 C551 C552
ARE NOT INSERTED IN AH VERSION
TO CHASSIS
W91
IR RECEIVER
N8C320F08
SHIELDING
POWER/PROTECTION IND.
N8C320F06
RED
GREEN
LD42
513AW
CZ43
W256
CB53
MICOM
IC53
Z86C0812PSC
IC51
24C01
IC52
IS1U60L
IC54
4094
IC55
4094
C8
220p BACKUP N.I.
Y51
12MHz
TUNER
TAPE1
TAPE2
DISC
CD
AUX
VIDEO
Q517
2SC1815
SOFT CLPPING IND.
MUTING BLINK
REMOTE MUTE
PROTECTION
IR OUT
IR IN
TO CB31
CZ52
TO CB34
CZ51
TAP2
TAP1
REMOTE MUTE
SOFT IND.
VOL+
VOL-
C320BEE PREAMP MODULE
J61
C611
40P LINEIN MODULE
15P LINEOUT MOULE
IC53: Z86C0812PSC
IC54 IC55: CD4094
IC51: 24C01
TEXT:
2SA1015
2SC1815
2SB647
2SD667
2SK369
IS1U60L
1: SIGNAL
2: GND
3: VCC
513AW
1: RED INDICATOR
2: COMMON CATHODE
3: GREEN INDICATOR

MAIN PCB


SPKOUT
S41
RCA33
RCA31
PHONE2
GND
LOUT
RL12/1
ROUT
PR
GND
PL
JDK
JDD
LHD
ACD
LHS
VC2
VB2
HPD
R453
D412
GND
GND
V+
V-
CB49
BUSBAR L
BUSBAR R
COPYRIGHT©2002
NAD ELECTRONICS
NAD C320BEE
R6640-2
NAD
N8C320D01-DC741130
-18V
+18V
+18V
+18V
MAIN BOARD

EXPLODED VIEW PARTS LIST



EXPLODED VIEW PARTS LIST

Ref. No.	Part No.	Description	Qt'y
C001	66-014001-0	Chassis	1
C002	66-001004-0	Base Cover	1
C003	75-001008-0	Foot	4
C004	78-001002-0	Rubber Pad	4
C005	70-014002-1	Heatsink 1	7
C006	66-001011-0	Module Box	2
C007	16-32140-00	Module PCB	2
C008	69-001011-0	Bus Bar A	1
C009	69-001013-0	Busbar C	1
C010	69-001012-0	Busbar B	1
C011	16-32110-00	Main PCB	1
C012	66-001006-0	BDP Supporter	1
C013	85-001001-0	PCB SPACER	1
C014	66-001007-0	PSU PCB Supporter	1
C015	16-32120-00	Power PCB	1
C016	70-001002-0	Heatsink 2	2
C017	66-001013-0	Stopper	1
C018	66-001009-0	Clamper	2
C019	70-014001-0	Heatsink	1
C020	70-001012-0	Heatsink Plate	1
C021	66-001010-0	Transformer Bracket	1
C022	67-001011-0	Transformer Box	1
⚠ C023*B,C	18-33201-20	Transformer TD-230-0150A	1
⚠ C024*AH	18-33201-10	Transformer	1
C025	66-001008-0	Metal Disc	1
C026	94-001004-0	Metal Disc Label	1
C027	78-001004-0	Heat Conductive Pad	1
F001	77-014001-0	Fascia Grey	1
	77-020001-0	Fascia Titanium	1
F002	73-014001-0	Volume Knob	1
F003	73-014002-0	Tone Knob	3
F004	74-001001-0	Tone Button	1
F005	77-001002-0	Tone Control Lozenge	1
F006	77-001001-0	Input Button Lozenge	1
F007	77-001006-0	Power Button	1
F008	77-001007-0	Power Button Bezel	1

Ref. No.	Part No.	Description	Qt'y
F009	74-001002-0	Input Button	1
F010	76-001001-0	LED Lens	9
F011	76-001002-0	IR Lens	1
F012	66-001005-1	IR Bracket	1
F013	16-32190-00	IR Board	1
F014	16-32130-00	Key Board	1
F015	85-014001-0	LED Spacer Support	1
F016	85-001002-0	LED Spacer Support	7
S001	66-014003-0	Subfascia	1
S002	16-32170-00	LED Board	1
S003	17-02001-00	Headphone Jack	1
S004	16-32150-00	SW Board	1
T001	66-014002-0	Top Cover, Grey	1
	80-020001-0	Top Cover, Titanium	1
R001*B,C	67-014001-0	Rear Panel	1
R001*AH	67-014002-0	Rear Panel	1
R002	30-63200-00	Shorting Plug	1
⚠ R003*AH	17-07002-10	AC Outlet	1
⚠ R004	84-001002-0	Strain Relief Bushing	1
⚠ R005*B,C	15-02251-20	AC Cord	1
⚠ R005*AH	15-10121-10	AC Cord	1
0001	61-022510-5	Machine Screw MB2.5X10	5
0002	61-022514-5	Machine Screw MB2.5X14	2
0003	61-022206-6	Self Taping Screw BTB2.6X4	2
0004	61-022206-6	Self Taping Screw BTB2.6X6	13
0005	61-023106-0	Self Taping Screw STB3X6	35
0006	61-023108-0	Self Taping Screw STB3X8	4
0007*AH	61-023208-0	Self Taping Screw BTB3X8	18
0007*C	61-023208-0	Self Taping Screw BTB3X8	19
0008	61-084108-0	Self Taping Screw STPW4X8	8
0009	64-108050-0	Bolt M8x50	1
0010	62-010202-5	Nut M2.5	7
0011	62-010802-0	Nut M8	2
0012	63-020820-0	Spring Washer 8mm	2

Parts marked with the symbol ⚠ are critical with regard to the risk of fire and electric shock.
Replace only with parts recommended by the manufacturer.

PARTS LIST

PART NUMBER	DESCRIPTION		PARTS LOCATION
DIODES			
33-44148-01	Switch Diode	1N4148	D61 D62 D63 D64
33-44148-02	Switch Diode	1N4148	D12 D13 D14 D15 D16 D17 D22 D23 D24 D25 D26 D27 D37 D38 D39 D310 D311 D312 D313 D403 D412 D417 D418 D423 D428 D429 D510 D511 D512 D513 D515 D42 D43
33-44148-03	Switch Diode	1N4148	D419 D420 D514
33-24002-00	Rectifier Diode	1N4002	D413 D424 D425 D426 D427 D430
33-14709-00	Zener Diode	4.7V,0.5W	D11 D12 D21 D22
33-15609-00	Zener Diode	5V6,0.5W	D58
33-16809-00	Zener Diode	6V8,0.5W	D59
33-12000-00	Zener Diode	20V,0.5W	D410 D411
33-12400-00	Zener Diode	18V,0.5W	D49
33-50350-00	LED	GREEN LED	D52 D53 D57 LD41 D54 D56 D51
33-50340-00	LED	AMBER LED	D55
33-50525-00	LED	DUAL COLOUR	
33-30142-00	Rectifier Bridge	DB104	D401
33-30822-00	Rectifier Bridge	KBU8D	D41 D45
TRANSISTORS			
31-00363-00	J-FET	K363	Q31 Q32
31-00369-00	J-FET	2SK369	Q61 Q62
31-00827-00	TRANSISTOR	A872	Q104 Q204
31-00970-00	TRANSISTOR	A970	Q12 Q15 Q22 Q25 Q102 Q202 Q63 Q65
31-01015-00	TRANSISTOR	A1015	Q12/1 Q16 Q26 Q44 Q45 Q47 Q411 Q55 Q57 Q58 Q49 Q410 Q417 Q419 Q56 Q51 QI2
31-01775-00	TRANSISTOR	C1775	Q103 Q203
31-01815-00	TRANSISTOR	C1815	Q11 Q17 Q21 Q27 Q43 Q46 Q48 Q412 Q414 Q418 Q420 Q52 Q53 Q54 Q59 Q510 Q511 Q512 Q513 Q514 Q515 Q516 Q517 Q421 QI12
31-02240-00	TRANSISTOR	C2240	Q13 Q14 Q23 Q24 Q101 Q201
31-00647-00	TRANSISTOR	B647	Q18 Q28 Q64 Q66
31-00667-00	TRANSISTOR	D667	Q19 Q29 Q67 Q68
31-00649-00	TRANSISTOR	2SB649A	Q42 Q110 Q113 Q210 Q213
31-00669-00	TRANSISTOR	2SD669A	Q41 Q111 Q112 Q211 Q212 Q413
31-02690-00	TRANSISTOR	KSC2690	Q116 Q216
31-00669-00	TRANSISTOR	2SD669A	Q116 Q216
31-01943-00	TRANSISTOR	2SA1943	Q114 Q214
31-05200-00	TRANSISTOR	2SC5200	Q115 Q215
33-60116-00	THYRISTOR	TIC116D/BT151-500R	D431 D432
INTEGRATED CIRCUITS			
03-07805-00	Regulator	LM7805	IC41
03-00082-00	Dual Op-amp	TL082CP/CN/D	IC43
03-01237-00	Protect IC	UPC1237HA	IC44
03-02400-00	EEPROM	24C01	IC51
03-04094-00	I/O IC	CD4094	IC54 IC55
03-86812-05	MICOM	Z86C0812PSC	IC53
03-00038-00	Remote IC	HS0038B	IC52
CRYSTALS			
04-11202-00	Crystal	12MHz	Y51
CAPACITORS			
05-15012-00	Ceramic Capacitor	15p,100V,20%	C63 C64
05-22051-00	Ceramic Capacitor	22p,50V,20%	C18 C19 C28 C29 C45 C46 C59 C510

PARTS LIST

PART NUMBER	DESCRIPTION		PARTS LOCATION
05-40012-00	Ceramic Capacitor	40p,100V,20%	C611
05-15012-00	Ceramic Capacitor	15p,100V,20%	C611
05-10151-01	Ceramic Capacitor	100p,50V,20%	C31 C32 C33 C34 C35 C36 C37 C38 C39 C310 C311 C312 C313 C314 C315 C316 C317 C318
05-10151-00	Ceramic Capacitor	100p,50V,20%	C69 C610
05-22151-01	Ceramic Capacitor	220p,50V,20%	C343 C344 C53
05-22151-00	Ceramic Capacitor	220p,50V,20%	C61 C62
05-47151-00	Ceramic Capacitor	470p,50V,20%	C12 C22 C335 C336 C112 C113 C212 C213
05-10312-00	Ceramic Capacitor	10n,100V,+50%-20%	C1 C6 C57 C514 C515 C516 C517 C518 C519 C520
05-47242-00	High-Voltage Ceramic Capacitor	4n7/400V,20%	C435
05-22361-02	Polyester Capacitor	22n,63V,10%,CL21	C119 C219
05-10322-00	Polyester Capacitor	10n/250V 10% CL21	C41 C42 C5
05-22361-01	Polyester Capacitor	22n,63V, 5% CL21	C327 C328
05-22361-00	Polyester Capacitor	22n,63V,10%,CL11	C120 C220 C434
05-10461-00	Monolithic	0.1uF/63V 20%	C3 C65 C66 C67 C68 C52 C58 C511 C512 (C550 C551 C552)
05-10461-05	Polyester Capacitor	0.1uF 63V 5% CL21	C329 C330
05-10461-01	Polyester Capacitor	0.1uF 63V 10% CL21	C4 C114 C115 C118 C214 C215 C218 C411 C412
05-10461-06	Polyester Capacitor	0.1uF 63V 10% CL21X	C17 C27 C322 C321 C345 C346 C337 C338 C117 C217 C319 C320
05-23461-00	Polyester Capacitor	0.23uF 63V 5% CL23B	C331 C332
05-22461-02	Polyester Capacitor	0.22uF 63V 20%	C432
05-95461-00	Polyester Capacitor	0.95uF/63V 5% CL23B	C333 C334
06-10951-00	Alum. Electrolytic Capacitor	1uF/50V 20%,CD110	C339 C340
06-47951-00	Alum. Electrolytic Capacitor	4.7uF/50V,20%,CD110	C421 C55 C56
06-10021-02	Alum. Electrolytic Capacitor	10uF/25V,20%,CD110	C11 C21 C48 C415 C416 C425 C426 C428 C429 C430 C431 C13 C14 C23 C24
06-10111-00	Alum. Electrolytic Capacitor	100uF/16V,20%,CD110	C420
06-47021-00	Alum. Electrolytic Capacitor	47uF/25V,20%,CD110	C110 C111 C210 C211 C323 C324 C325 C326 C341 C342 C47 C49 C410 C12/1
06-10160-00	Alum. Electrolytic Capacitor	100uF/6.3V,20%,CD110	C436
06-10111-00	Alum. Electrolytic Capacitor	100uF/16V,20%,CD110	C103 C104 C203 C204 C51
06-22131-00	Alum. Electrolytic Capacitor	220uF/35V,20%,CD110	C413 C414
06-22151-00	Alum. Electrolytic Capacitor	220uF/50V,20%,CD110	C43 C44
06-22161-00	Alum. Electrolytic Capacitor	220uF/63V,20%,CD110	C15 C16 C25 C26
06-33111-01	Alum. Electrolytic Capacitor	330uF/16V,20%,CD110	C422
06-22260-00	Alum. Electrolytic Capacitor	2200uF/6.3V,20%,CD110	C116 C216
06-22211-00	Alum. Electrolytic Capacitor	2200uF/16V,20%,CD110	C433
06-22251-00	Alum. Electrolytic Capacitor	2200uF/50V,20%,CD110	C424
06-33251-00	Alum. Electrolytic Capacitor	3300uF/50V,20%,CD110	C423
06-15351-01	Alum. Electrolytic Capacitor	15000uF/50V 20%,CD294	C417 C418
RESISTORS			
07-20100-00	Metal Film Resistor	10R,1/6W,5%	R617 R618 R619 R620
07-20330-00	Metal Film Resistor	33R,1/6W,5%	R615 R616
07-20121-01	Metal Film Resistor	120R,1/6W,5%	R621
07-20181-10	Metal Film Resistor	180R,1/4W,5%	R327 R328
07-20221-00	Metal Film Resistor	220R,1/6W,5%	R61 R62
07-25600-00	Metal Film Resistor	560R,1/6W, 2%	R65 R66
07-24300-00	Metal Film Resistor	430R,1/6W, 1%	R69 R610
07-20102-00	Metal Film Resistor	1K,1/6W,5%	R67 R68 R611 R612
07-20103-00	Metal Film Resistor	10K,1/6W,5%	R613 R614
07-20105-00	Metal Film Resistor	1M,1/6W,5%	R63 R64
07-20106-00	Metal Film Resistor	10M,1/6W,5%	D31 D32
07-23900-10	Metal Film Resistor	390R,1/4W,1%	R331 R332 R325 R326
07-27500-10	Metal Film Resistor	750R,1/4W,1%	R323 R324
07-21601-10	Metal Film Resistor	1.6K,1/4W,1%	R329 R330
07-20332-10	Metal Film Resistor	3K3,1/4W,5%	R321 R322

PARTS LIST

PART NUMBER	DESCRIPTION		PARTS LOCATION
07-20512-10	Metal Film Resistor	5.1K,1/4W,5%	R359 R360
07-21402-10	Metal Film Resistor	14K,1/4W,5%(OMIT)	R319 R320
07-20202-10	Metal Film Resistor	2K,1/4W,5%	R412
07-20222-10	Metal Film Resistor	2.2K,1/4W,5%	R414
07-24301-00	Metal Film Resistor	4.3K/1/2W 1%	R146 R246
07-21500-10	Metal Film Resistor	150R,1/4W,1%	R149 R249
07-10330-00	Carbon Film Resistor	33R,1/6W,5%	RI2
07-10101-00	Carbon Film Resistor	100R,1/6W,5%	C8
07-10102-00	Carbon Film Resistor	1K,1/6W,5%	RI1,RI3
07-10100-10	Carbon Film Resistor	10R,1/4W,5%	R136 R137 R154 R155 R236 R237 R254 R255 R2 R514 R515 R516
07-10220-10	Carbon Film Resistor	22R,1/4W,5%	R142 R143 R242 R243
07-10330-10	Carbon Film Resistor	33R,1/4W,5%	R115 R116 R215 R216
07-10390-10	Carbon Film Resistor	39R,1/4W,5%	R107 R108 R207 R208
07-10680-10	Carbon Film Resistor	68R,1/4W,5%	R335 R336
07-10470-10	Carbon Film Resistor	47R,1/4W,5%	R119 R219
07-10820-10	Carbon Film Resistor	82R,1/4W,5%	R103 R106 R111 R112 R120 R203 R206 R211 R212 R220
07-10101-10	Carbon Film Resistor	100R,1/4W,5%	R1 R3 R14 R24 R416 R417 R418 R419 R461 R465
07-10221-10	Carbon Film Resistor	220R,1/4W,5%	R432
07-10331-10	Carbon Film Resistor	330R,1/4W,5%	R51
07-10391-10	Carbon Film Resistor	390R,1/4W,5%	R138 R238
07-10471-10	Carbon Film Resistor	470R,1/4W,5%	R11 R21 R31 R32 R33 R34 R35 R36 R37 R38 R39 R139 R239 R310 R311 R312 R313 R314 R315 R316 R317 R318 R52 R503
07-10681-10	Carbon Film Resistor	680R,1/4W,5%	R41 R42 R43 R44 R47 R48 R49 R410 R411 R413
07-10911-10	Carbon Film Resistor	910R,1/4W,5%	R426
07-10102-10	Carbon Film Resistor	1K,1/4W,5%	R147 R247 R474 R476 R458 R459 R460 R462
07-10132-10	Carbon Film Resistor	1.3K,1/4W,5%	R422 R423 R424 R425
07-10222-10	Carbon Film Resistor	2K2,1/4W,5%	R58 R59 R428 R511 R512 R434 R526 R527 R440 R501
07-10472-10	Carbon Film Resistor	4K7,1/4W,5%	R401 R482 R466 R528 R541 R542 R543 R544 R545 R546 R547 R548 R549 R550 R551 R552 R553 R554 R333 R334
07-10512-10	Carbon Film Resistor	5K1,1/4W,5%	R429 R533
07-10622-10	Carbon Film Resistor	6K2,1/4W,5%	R480
07-10682-10	Carbon Film Resistor	6K8,1/4W,5%	R12/1
07-10103-10	Carbon Film Resistor	10K,1/4W,5%	R470 R471 R502 R529 R556 R557 R558 R53 R54 R469 R508
07-10153-10	Carbon Film Resistor	15K,1/4W,5%	R148 R248 R441 R530
07-10363-10	Carbon Film Resistor	36K,1/4W,5%	R420 R421
07-10223-10	Carbon Film Resistor	22K,1/4W,5%	R12/2 R15 R25 R152 R252 R468 R444 R463 R464
07-10393-10	Carbon Film Resistor	39K,1/4W,5%	R19 R101 R105 R110 R29 R205 R210 R487 R488 R201
07-10473-10	Carbon Film Resistor	47K,1/4W,5%	R123 R223 R473 R477 R437
07-10563-10	Carbon Film Resistor	56K,1/4W,5%	R436 R442 R445 R446
07-10104-10	Carbon Film Resistor	100K,1/4W,5%	R121 R122 R221 R222 R347 R348 R435 R448 R478 R479 R489 R490 R491

PARTS LIST

PART NUMBER	DESCRIPTION		PARTS LOCATION
07-10184-10	Carbon Film Resistor	180K,1/4W,5%	R438
07-10224-10	Carbon Film Resistor	220K,1/4W,5%	R12 R22 R102 R104 R202 R204 R457 R345 R346
07-10334-10	Carbon Film Resistor	330K,1/4W,5%	R451 R483
07-10474-10	Carbon Film Resistor	470K,1/4W,5%	R472
07-10564-10	Carbon Film Resistor	560K,1/4W,5%	R486
07-10105-10	Carbon Film Resistor	1M,1/4W,5%	R337 R338 R339 R341 R342 R343 R349 R350 R351 R352 R353 R354 R355 R356 R357 R358
07-10225-10	Carbon Film Resistor	2M2,1/4W,5%	R433
07-30339-00	Flame Proof	3.3R/0.5W 5%	R124 R125 R224 R225
07-30331-00	Flame Proof	330R/0.5W 5%	R128 R129 R228 R229
07-30109-01	Flame Proof	1R/1W 5%	R150 R250
07-30221-00	Flame Proof	220R/1W FP 5%	J206
07-30221-03	Flame Proof	220R/2W FP 5%	R452 R453
07-50271-02	Fusible Resistor	270R/2W 5% FS	R427
07-30122-02	Flame Proof	1K2/2W FP 5%	R153 R253
07-30272-02	Flame Proof	2K7/2W FP 5%	R126 R127 R226 R227
07-40507-03	Ceramic Case	0.05R/3W CE 5%	R431
07-40687-03	Ceramic Case	0.068R/3W CE 5%	R144 R145 R244 R245
07-50330-00	Fusible Resistor	33R/0.5W 5% FS	R45 R46
07-50151-00	Fusible Resistor	150R,1/2W,5%	R443
07-50100-01	Fusible Resistor	10R/1W FS 5%	R151 R251
07-50820-02	Fusible Resistor	82R/1W FS 5%	R130 R131 R230 R231
09-02101-00	Variable Resistor	100R	VR11 VR21
09-02301-00	Variable Resistor	300R	VR12 VR22
07-70471-08	Posistor	PTH9M04BF471TS2F333	R467
07-70471-09	Posistor	PTH9M04BE471TS2F333	R439
09-01103-01	Potentiometer	RK163121A2CA 10KAx2	RT31 RT32
09-01203-05	Potentiometer	RK16812MG 20KBx2	RT33
09-01203-03	Potentiometer	RK163121A10D 20KMNx2	RT34
INDUCTORS			
08-01010-00	Inductor	1uH	L11 L21
19-05005-00	Ferrite	5x3x5	
CONNECTORS / SOCKETS / CABLES			
13-10001-00	Socket		TP4 （×4）
13-10001-03	Socket	20mm	P11 P12 P13 P14 P15
13-12509-01	Socket	S006	J61
13-23903-00	Socket	3.96A-3Y1	CB410 CB42 CB411 CZ411
13-23904-00	Socket	3.96A-4Y1	CB49 CZ48
13-22505-00	Socket	XHB2.5A-5A	CB45
13-22507-00	Socket	XHB2.5A-7A	CB47
13-22508-00	Socket	XHB2.5A-8A	CB34
13-22510-00	Socket	XHB2.5A-10A	CB31
13-23907-00	Socket	3.96A-7Y1	CB41
14-32104-00	Wire	4P3.96-A80A	
14-32005-00	Wire	5P2.54-A350B	CZ44
14-32107-00	Wire	7P2.54-A80B	CZ46
14-32108-00	Wire	8P2.54-A350B	CZ51
14-32010-00	Wire	10P2.54-A350B	CZ52
14-32003-00	Wire	3P2.54-80	
14-32102-00	Wire	2P7.92-A280A	
14-32001-01	Wire	1007#26 100	
15-02251-20	AC CORD （C）	WB01HS-001	
15-10121-10	AC CORD （AH）	WB05HS-001	
17-01004-00	4RCA	4RCA	AV-8.4-13
17-01006-00	6RCA	6RCA	AV-8.6-13
17-02001-03	3.5 PHONE JACK	PHONEJACK1	J12
17-02002-00	3.5 PHONE JACK	PHONEJACK2	J-IN J-OUT
17-02001-00	6.35 PHONE JACK		JK41
32-28042-00	Eyelet	GND-8	
RELAYS			
12-02101-00	Relay	HRS2H-S-DC12V	RL31 RL32 RL33 RL34 RL35 RL36 RL37 RL38
12-01101-03	Relay	F1AA012V	RL12/1
11-05202-02	Slide Switch	SK-22F03G7	S41
11-01101-20	Power Switch	SDDLB1027u-RN	SW42

PARTS LIST

PART NUMBER	DESCRIPTION		PARTS LOCATION
11-04101-00	Tact Switch	IT-1102D-116	S52 S53 S57 S55 S54 S56 S51
11-02202-00	Tone Switch	SPUN19K605	SW31
FUSES			
20-12501-00	Fuse	T0.5AL/250V	F45
20-12632-00	Fuse	T6.3AL/250V	F41 F42 F43 F44
20-20000-00	Fuse Holder	HF-004	
TRANSFORMERS			
18-33201-20	Transformer	TD-230-0150A	T401
18-33201-10	Transformer	TD-120-0150D	T401
PCB			
16-32130-00	KEY PCB		
16-32160-00	IRE PCB		
16-32170-00	LED PCB		
16-32140-00	MODULE PCB		
16-32120-00	POWER PCB		
16-32150-00	SW PCB		
16-32110-00	MAIN PCB		
16-32180-00	PHONE PCB		
16-32190-00	IR INTERFACE PCB		
HARDWARE			
66-014001-0	Chassis		
67-014001-0	Rear Panel (C Version)		
67-014002-0	Rear Panel (AH Version)		
66-014002-0	Top Cover		
66-014003-0	Subfascia 2		
66-001005-1	IRE Bracket		
66-001013-0	Baffle		
66-001011-0	Module Bracket		
66-001007-0	PCB SUPPORT		
66-001010-0	TRANSFORMER BRACKET		
66-001004-0	BASE COVER		
66-001008-0	METAL DISC		
66-001009-0	CLAMPER		
66-001006-0	BDP SUPPORT		
70-001012-0	Heatsink Plate		
70-014002-1	Heatsink 1	L=60	
70-001002-0	Heatsink 2		
70-014001-0	Heatsink		
69-001011-0	Bus bar A		
69-001012-0	Bus bar B		
69-001013-0	Bus bar C		
69-001010-0	BDP PIN		
67-001011-0	BOX		
30-63200-00	SHORTING PLUG		
69-001001-0			
69-001002-0			
77-001001-0	Input Button Lozenge	27215306	
77-001002-0	Tone Control Lozenge	27215309	
74-001001-0	Tone Button	28325610	
74-001002-0	Input Button	28325608	
76-001002-0	IR Lens	28191833	
77-001006-0	Power Button		
77-001007-0	Power Button Bezel		
77-014001-0	Fascia		
76-001001-0	LED Lens		
73-014002-0	Tone Knob		
73-014001-0	Volume Knob		
75-001008-0	Foot		
30-63200-01	Plug Cap		
17-03002-02	Binding Post		
17-03002-01			
71-001001-0			
73-001003-0			
73-001004-0			
73-001005-0			
73-001006-0			
SCREWS / NUTS / BOLTS			
61-023108-0	Self Taping Screw	STB3X8	
61-023106-0	Self Taping Screw	STB3X6	
61-084108-0	Self Taping Screw	STPW4X8	
61-023208-0	Self Taping Screw	BTB3X8	
61-022206-6	Self Taping Screw	BTB2.6X6	

PARTS LIST

PART NUMBER	DESCRIPTION		PARTS LOCATION
61-022204-6	Self Taping Screw	BTB2.6X4	
61-044514-0	Machine Screw	MT4X14	
61-022510-5	Machine Screw	MB2.5X10	
61-022514-5	Machine Screw	MB2.5X14	
62-010202-5	Nut	M2.5	
64-108050-0	Bolt	M8X50	
62-010802-0	Nut	M8	
63-020820-0	Spring Washer	8mm	
MECHANICAL MISCELLANEOUS			
78-001002-0	Rubber Pad		
78-001001-0	Sleeve Boot	811810-23	
85-001001-0	PCB SPACER	TCBS-20	
85-001002-0	Led Spacer Support	LEDS-10	
85-014001-0	Led Spacer Support	LEDS-12	
84-001002-0	Relief Bushing	SB4F-4	
94-001004-0	LABEL		
78-001004-0	Heat Conductive Pad	SFAT482	
78-005002-0	Insluation Cushion (Small)	SFAT690	
84-001003-0	Cable Tie	YJ-100	
84-001001-1	Cable Tie	KL-2（3M）	
78-014001-0	Heat Shrinking Tube	40×30mm	
PACKING			
88-014001-0	CARTON BOX		
89-014001-1	POLYFOAM END CAP		
89-001002-0	Polyform BDP Unit		
90-001001-0	POLYBAG		
90-001002-0	MANU POLYBAG		
90-001003-0	AC CORD POLYBAG		
90-001004-0	EPE FASCIA		
94-014001-0	SERIAL NO LABEL		
94-014002-0	VERSION LABEL (AH)		
94-014003-0	VERSION LABEL (B)		
94-014004-0	VERSION LABEL (C)		
ACCESSORIES			
30-43210-00	INSTRUCTION MANUAL		
30-13210-00	REMOTE CONTROL	SR-4	
30-23200-00	BATTERIES	AAA SIZE	

SERVICE MANUAL

C 320BEE

STEREO
AMPLIFER

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